PPS02 Pressure Sensor Element — Ø12 mm

Media-isolated, all-316L stainless steel piezoresistive element for OEM transducers



SS316L MEDIA ISOLATED

FEATURES

- All-316L stainless steel housing and diaphragm
- Silicon piezoresistive die, isolated by silicone oil fill
- Non-linearity ±0.2% FS typical (BFSL)
- Constant current (1.5 mA) or constant voltage (10 V) excitation
- Uncompensated or temperature-compensated versions
- Pressure ranges from 150 PSI to 9,000 PSI
- Gauge, Absolute & Sealed Gauge references
- Kovar pins or wire leads · O-ring seal or threaded ports
- Rated to 100 g shock and 20 g vibration

DESCRIPTION

The PPS02 is a media-isolated stainless steel pressure sensing element engineered for high-accuracy measurement in harsh or corrosive environments. A silicon piezoresistive die is sealed in silicone oil behind a 316L diaphragm, so the die never contacts the measured medium.

The PPS02 is the core of a pressure transducer or transmitter: its millivolt bridge output is easily amplified to a standard signal. The compact 12 mm form factor simplifies OEM integration, and custom configurations are available on request.

APPLICATIONS

- Process control systems
- Pressure calibration instruments
- Refrigeration equipment and HVAC control
- Hydraulic systems and valves
- Level measurement
- Biomedical instruments
- Ships and navigation
- Aircraft and avionics systems

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	**−40 to 125 °C**	Proof Pressure	**1.5× full scale**
Storage Temperature	**−40 to 125 °C**	Burst Pressure	**2× full scale**
Compensated Temperature	**−10 to 80 °C**	Vibration	**20 g (20–5000 Hz)**
Service Life	**1×10⁶ cycles**	Shock	**100 g (10 ms)**

Electrical & performance specifications

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation — constant current	Iexc	—	1.5	2.0	mA
Excitation — constant voltage	Vexc	—	10	—	VDC
Input impedance — constant current	Rin	2	—	5	kΩ
Input impedance — constant voltage	Rin	3	—	18	kΩ
Full-scale output @ 1.5 mA	Vfso	60	80	100	mV
Full-scale output @ 10 V	Vfso	90	120	150	mV
Zero offset	Vzero	−2	±1	+2	mV
Accuracy	—	−0.25	—	+0.25	%FS
Non-linearity (BFSL)	—	−0.25	±0.2	+0.25	%FS
Hysteresis	—	−0.05	±0.03	+0.05	%FS
Repeatability	—	−0.05	±0.03	+0.05	%FS
Zero temperature drift [1]	—	−1.5	±0.75	+1.5	%FS
Sensitivity temperature drift [1]	—	−1.5	±1.0	+1.5	%FS
Thermal hysteresis [1]	—	−0.075	±0.05	+0.075	%FS
Long-term stability	—	−0.3	±0.2	+0.3	%FS/yr
Response time (to 90% FS)	tr	—	—	1	ms
Insulation resistance @ 250 VDC	—	200	—	—	MΩ
Compensated temperature	—	−10	—	80	°C
Operating temperature	—	−40	—	125	°C
Pressure range	—	150	—	9,000	PSI

[1] Compensated versions only, over the compensated temperature range, referenced to its midpoint. Non-linearity calculated by the BFSL least-squares method.

Electrical connections

PIN	FUNCTION
P1	−IN (excitation −)
P2	+OUT (output +)
P3	+IN (excitation +)
P4	−OUT (output −)
P5	−IN (excitation −)

WIRING NOTES

Shown: 5 Kovar pin version (K5), compensated, 1.5 mA constant-current excitation. P1 and P5 are both −IN; connect either. The wire-lead version (W4) brings out +IN, −IN, +OUT and −OUT only. Follow the pin assignment exactly — incorrect wiring can damage the element. For 10 V constant-voltage excitation (code V), confirm the pinout with Phoenix Sensors.

Pin configuration

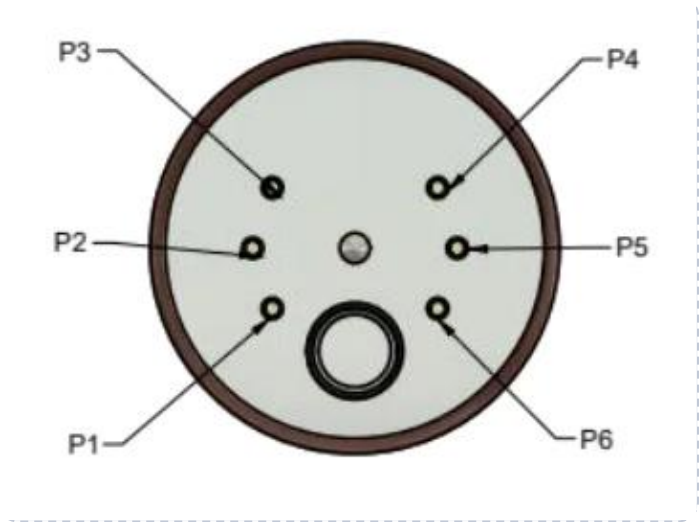


Fig. 1 — Pin layout, viewed from the pin side.

Package, media & installation

Package

A full 316L stainless steel housing and diaphragm provide superior corrosion resistance, biocompatibility, and strength. The 12 mm design gives a compact form factor for OEM integration.

Sensing structure

Applied pressure is transmitted through the stainless steel diaphragm and the sealed silicone oil fill to a diffused-silicon piezoresistive die. The die never contacts the measured medium.

Pressure connections

Supplied as a standalone element with an O-ring face seal for direct integration, or with a standard pressure port: 1/4" NPT, 1/8" NPT, 7/16-20 UNF, or 9/16-18 UNF. Custom port configurations are available on request.

Media

Compatible with liquids and gases that are compatible with 316L stainless steel, including hydraulic fluids, refrigerants, and saltwater.

Wetted parts

316L stainless steel diaphragm and housing, sealed with a fluorine rubber (FKM) O-ring. The internal fill is silicone oil for thermal stability and media isolation.

Pressure ranges

150 PSI to 9,000 PSI in gauge, absolute, or sealed gauge reference. Custom pressure ranges are available for OEM customers.

Stability

Low hysteresis and repeatability error (±0.03% FS typical) and long-term stability of ±0.2% FS per year typical.

Handling

Do not touch the diaphragm with hard objects — this can damage it. Seal on the O-ring only, and confirm that system overload stays below the proof pressure rating.

±0.25%	9,000	≤1 ms	Ø12 mm
Accuracy FS	Max range PSI	Response time	Element diameter

Excitation & compensation

EXCITATION MODE	RECOMMENDED	INPUT IMPEDANCE	FULL-SCALE OUTPUT	NOTES
Constant current	1.5 mA (2.0 mA max)	2–5 kΩ	60–100 mV (80 typ)	Code I · standard, recommended
Constant voltage	10 VDC	3–18 kΩ	90–150 mV (120 typ)	Code V

Bridge output

The PPS02 is a four-arm piezoresistive Wheatstone bridge. Its output is an unamplified, differential millivolt signal proportional to applied pressure and to excitation. Pair it with an instrumentation amplifier or signal-conditioning IC to build a transducer with a standard output.

$$V_{out} = V_{zero} + V_{FSO} \times (P \,/\, P_{FS})$$

Full-scale output scales with excitation. Keep the excitation source stable and low-noise; any drift appears directly as span error.

Temperature compensation

Compensated (code 2) elements include a compensation board, sealed with potting for moisture protection, that corrects zero and span over the -10 to 80 °C compensated range. Compensation is performed at the excitation ordered: 1.5 mA (code I) or 10 V (code V).

Uncompensated (code 1) elements provide the raw bridge for customers who apply their own analog or digital compensation.

APPLICATION NOTES

1.5 mA constant-current compensation (code I) is standard — select it when possible.

For 10 V constant-voltage compensation, order code V. For custom temperature ranges, contact Phoenix Sensors.

Equivalent circuit — 4-wire bridge

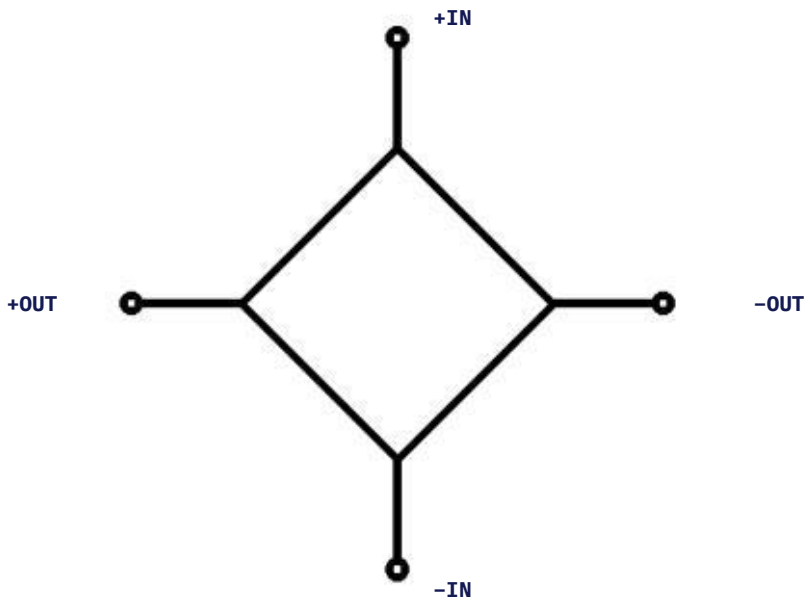
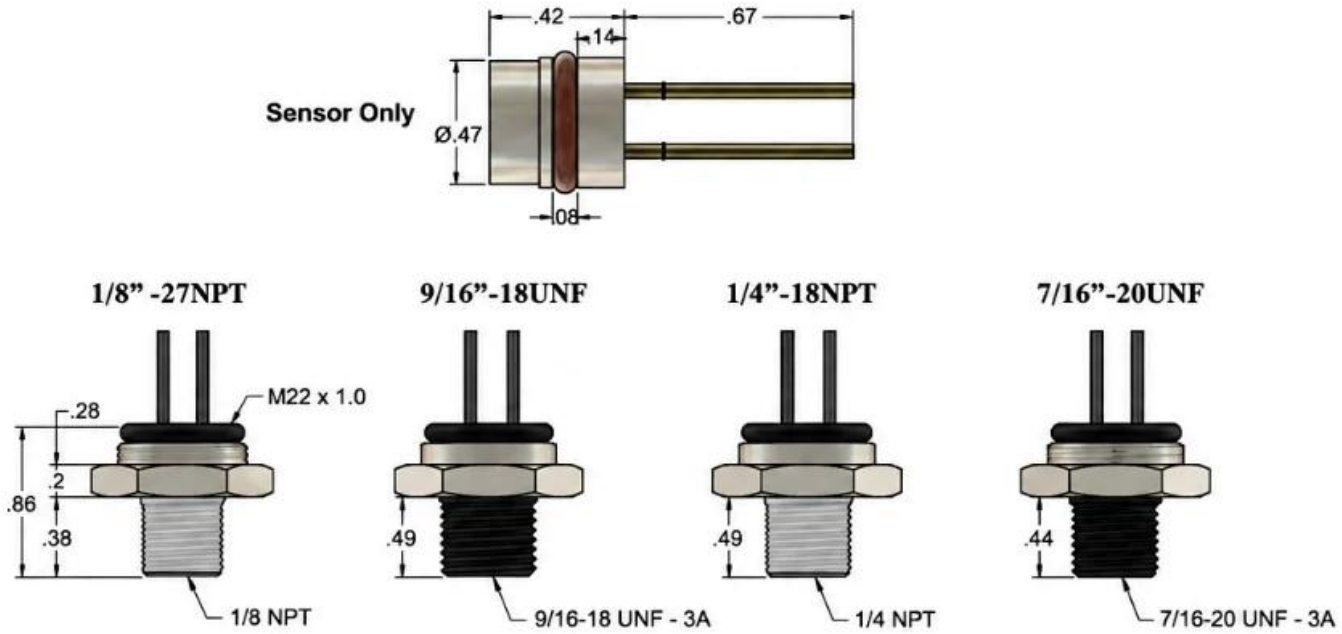


Fig. 2 — Wheatstone bridge equivalent circuit.

Mechanical dimensions — inches



FEATURE	DETAIL
Element diameter	Ø12 mm (Ø0.47 in)
Housing & diaphragm	Stainless steel 316L
Fill fluid	Silicone oil
O-ring	Fluorine rubber (FKM)
Electrical interface	Gold-plated Kovar pins (K5) or wire leads (W4)
Pressure ports	None (O-ring seal) · 1/4 & 1/8 NPT · 7/16-20 & 9/16-18 UNF

NOTES

1) Dimensions in inches. Tolerances unless noted: X.X ±0.15 · X.XX ±0.010 · X.XXX ±0.005.

2) Seal on the O-ring; do not load or touch the diaphragm face.

3) Confirm system overload stays below the proof pressure rating.

4) Custom ports and fittings available on request.

Ordering information — part-number configuration

PPS02	–	5K	A	2	2	–	K5	–	I
MODEL		RANGE	TYPE	COMP	PORT		ELECTRICAL		EXCITATION

Model	Range (XX)	Type (Y)	Compensation (C)	Port (P)	Electrical (E)	Excitation (X)
PPS02 Ø12 mm	150 = 150 PSI 9K = 9,000 PSI	G = Gauge A = Absolute S = Sealed Gauge	1 = Uncompensated 2 = Compensated	S = Sensor Only (No Port) 1 = 1/4"-18 NPT 2 = 1/8"-27 NPT 3 = 7/16"-20 UNF 4 = 9/16"-18 UNF AN	K5 = 5 Kovar Pins W4 = 4 Wire Leads	I = 1.5 mA Constant Current V = 10 V Constant Voltage

SPECIFY WITH YOUR ORDER

Custom pressure range · Custom compensated temperature range · Custom pressure port or fitting.

EXAMPLE PART NUMBERS

PPS02-150G11-W4-I → 0–150 PSI · gauge · uncompensated · 1/4" NPT · 4 wire leads · 1.5 mA

PPS02-5KA22-K5-V → 0–5,000 PSI · absolute · compensated · 1/8" NPT · 5 Kovar pins · 10 V

Configure your PPS02 element

Custom ranges, compensation, and pressure ports are available for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE
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